

## COMPLETE LISTING OF ALL CLAIMS

Kindly amend claims **8, 20, 29, and 31** as shown in the listing of claims below. This listing of claims will replace all prior versions, and listings of claims in the application.

- 1 1. (original) A nanostructured apparatus, comprising:  
2 a mesoporous template having a network of regularly-spaced pores, wherein a characteristic  
3 dimension of the pores is between about 1 nm and about 100 nm; and  
4 a layer of material that substantially coats one or more walls of the pores to a substantially  
5 uniform thickness.
- 1 2. (original) The apparatus of claim 1 wherein the pores include one or more sets of  
2 substantially straight and parallel pores.
- 1 3. (original) The apparatus of claim 2 wherein the pores include first and second sets of  
2 substantially straight and parallel intersecting pores, wherein the pores in the first set run  
3 substantially perpendicular to the pores in the second set.
- 1 4. (original) The apparatus of claim 3 wherein the layer of material coats the walls of the pores  
2 in both sets in a substantially uniform fashion.
- 1 5. (original) The apparatus of claim 3 further comprising a third set of substantially straight and  
2 parallel pores that intersect the pores in the first and/or second sets, wherein the pores in the  
3 third set run substantially perpendicular to the pores in the first and second sets.
- 1 6. (original) The apparatus of claim 5 wherein the layer of material coats the walls of the pores  
2 in all three sets in a substantially uniform fashion.
- 1 7. (original) The apparatus of claim 1 wherein the material is a first semiconductor material.
- 1 8. (currently amended) The apparatus of claim [[1]] 7, further comprising a second  
2 semiconductor material disposed within one or more of the pores, wherein the first and  
3 second semiconductor materials have complementary charge transfer properties.
- 1 9. (original) The apparatus of claim 1, wherein the mesoporous template is made from an  
2 insulating material.

- 1 10. (original) The apparatus of claim 9 wherein the insulating material is silica (SiO<sub>2</sub>).
- 1 11. (original) The apparatus of claim 1 wherein the mesoporous template is made from a  
2 semiconducting material.
- 1 12. (original) The apparatus of claim 1 wherein the layer of material includes one or more  
2 reactant materials, catalyst materials, light absorbing materials or semiconducting materials.
- 1 13. (original) The apparatus of claim 12 wherein the layer of material includes a first  
2 semiconducting material.
- 1 14. (original) The apparatus of claim 13 further comprising a second semiconductor material  
2 disposed on the first semiconductor material, wherein the first and second semiconductor  
3 materials have complementary charge transfer properties.
- 1 15. (original) The apparatus of claim 14 wherein at least one of the first and second  
2 semiconductor materials is a light absorbing material.
- 1 16. (original) The apparatus of claim 14 wherein one of the first and second semiconductor  
2 materials is an organic material.
- 1 17. (original) The apparatus of claim 1 wherein the layer of material has been deposited by  
2 atomic layer deposition.
- 1 18. (original) The apparatus of claim 1 wherein the layer of material includes a light-absorbing  
2 semiconductor material.
- 1 19. (original) The apparatus of claim 1 wherein the layer of material includes a non-reactive  
2 metal or metal oxide, that provides an inert surface whereby that apparatus may act as a filter.
- 1 20. (currently amended) The apparatus of claim 1 wherein the layer of material includes a  
2 reactive metal or metal oxide that provides ~~an inert~~ a reactive surface whereby the apparatus  
3 may act as a catalyst and/or filter.
- 1 21. (original) The apparatus of claim 1 wherein the layer material has optical transmission,  
2 reflection, absorption or other properties whereby the apparatus may act as an optical device.

1 22. (original) The apparatus of claim 21 wherein the optical device is a luminescent, electro-  
2 optic, and magneto-optic waveguides, optical filters, optical switches, amplifiers, laser diodes,  
3 multiplexers, optical couplers.

1 23. (original) The apparatus of claim 1 wherein the layer of material includes a semiconducting  
2 or conducting surface coating that can transmit electrical signals arising from binding of a  
3 molecule to the surface coating, whereby the apparatus is a sensor.

1 24. (original) An optoelectronic device, comprising:  
2 an active layer disposed between a first electrode and a second electrode, wherein the active  
3 layer includes a mesoporous template having a network of regularly-spaced pores, wherein a  
4 characteristic dimension of the pores is between about 1 nm and about 100 nm; and one or  
5 more semiconducting materials that substantially coat one or more interior walls of the pores  
6 to a substantially uniform thickness.

1 25. (original) The device of claim 24 wherein the mesoporous template is made of silica

1 26. (original) The device of claim 25 wherein the first semiconducting material has been  
2 deposited by atomic layer deposition.

1 27. (original) The device of claim 26, wherein the one or more semiconducting materials include  
2 a first semiconducting material and a second semiconducting material, wherein the first and  
3 second semiconducting materials have complementary charge transfer properties.

1 28. (original) The device of claim 24 wherein the semiconducting material is configured such  
2 that the device is an LED, laser, or photovoltaic device.

1 29. (withdrawn, currently amended) A method for making a nanostructured apparatus,  
2 comprising:  
3 forming a mesoporous template having a network of regularly-spaced pores, wherein a  
4 characteristic dimension of the pores is between about 1 nm and about 100 nm; and  
5 ~~an active material coating one or more interior walls of the pores;~~  
6 substantially coating one or more walls of the pores with a layer of material to a substantially  
7 uniform thickness.

1 30. (withdrawn) The method of claim 29 wherein forming a mesoporous template includes  
2 disposing a sol on a substrate, wherein the sol includes one or more alkoxides with a central  
3 element X, one or more surfactants, one or more condensation inhibitors, water, and a  
4 solvent,  
5 evaporating the solvent from the sol to form a surfactant-templated porous film, and  
6 crosslinking the surfactant-templated porous film to form mesoporous template.

1 31. (withdrawn, currently amended) The method of claim 29 wherein coating one or more walls  
2 of the pores with a layer of material includes depositing the ~~active~~ layer of material by atomic  
3 layer deposition.